CLAIMS

1. A method for analysing in real-time in a paper machine or
board machine the surface structure of a web (1) produced in a
5   paper machine or a board machine, which method comprises:
- that an imaging system is arranged above or below the web (1)
and is directed towards a pre-determined area (3) of the web
(1),
- that an illumination system is arranged above or below the
10   web (1) in order to illuminate the area (3) from a pre-
determined direction with obliquely incident light, and
- that an image analysis system is arranged in association with
the imaging system,
characterised in that the method further comprises:
15   - an image capture step (7) in which the imaging system is
caused to take several digital images of the web (1) under the
said oblique incident illumination and during a pre-determined
period, when the web (1) passes in front of the imaging system,
which images form an image sequence that images a series of
20   surface sections (4, 4', 4") along a band (8) in the web (1),
and
- an evaluation step (9) that is carried out by the image
analysis system and which comprises an image analysis step
(11), that comprises a first analysis operation (16) in which
25   the variance of the pixel values in each pixel row in each
image in the image sequence is determined within a pre-
determined wavelength band, and a second analysis operation
(17) in which the mean value of the variances of all pixel rows
of all images in the image sequence is calculated.
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2.   The method according to claim, **characterised in that** the
first analysis operation (16) comprises the Fourier
transformation of each pixel row with the aid of an FFT
algorithm, after which the variance in the said wavelength band
35   is calculated.

3 .   The method according to claim 2, **characterised in that** the
web (1) is of board and that the wavelength band comprises the
wavelengths 0.7-4 mm.

4.   The method according to claim 2, **characterised in that** the web (1) is of paper and that the wavelength band comprises the wavelengths 3-15 mm.

5.   The method according to any one of the claims 1-4, **characterised in that** the evaluation step (9) also comprises an image processing step (10), which precedes the image analysis step (11), in order to reduce contributions from disturbing sources of error.

6.   The method according to claim 5, **characterised in that** the image processing step (10) comprises:
- a first image operation (12), in which each pixel value in each image in the image sequence is divided by the mean pixel value of the image and multiplied by a pre-determined factor,
- a second image operation (13), in which the edges of the image are cropped such that the image obtains pre-determined dimensions,
- a third image operation (14), in which the image is divided along the longitudinal direction of the web (1) into groups with a pre-determined number of consecutive pixel rows in each group, after which new pixel rows are formed by the calculation of the mean value of the pixel values in each pixel column in each group and its assignment to the pixels in the new pixel row, and
- a fourth image operation (15), in which the image is high-pass filtered in the transverse direction of the web (1).

7. The method according to claim 6, **characterised in that** the said high-pass filtration occurs through the calculation of a low-pass signal and its subtraction from the image.

8. The method according to claim 7, **characterised in that** the said low-pass signal is obtained through an FIR Blackman filter being caused to operate on the image.

9. A device for the real-time analysis in a paper machine or a board machine of the surface structure of a web (1) of paper or

board produced in a paper machine or a board machine, which
device comprises:

- an imaging system that is arranged above or below the web and
is directed towards a pre-determined area of the web,

5   - an illumination system that is arranged above or below the
web in order to illuminate from a pre-determined direction the
area with obliquely incident light, and

- an image analysis system that is arranged to be in
communication with the imaging system,

10 **characterised in that**

- the imaging system is arranged to take under the said
illumination and during a pre-determined period several digital
images of the web (1) when the web (1) passes in front of the
imaging system, which images form a series of surface sections

15 (4, 4', 4") along a band (8) in the web (1), and

- that the image analysis system is arranged to calculate the
variance in the pixel values in each pixel row in each image in
the image sequence, and to calculate the mean value of the
variances of all pixel rows of all images in the image

20 sequence.